Anusuya Das, PhD

EDUCATION

Indiana University School of Law (Indianapolis) JD **FA 2021-**
Massachusetts Institute of Technology (MIT) PhD, Biological Engineering **2005-2010**
Arizona State University (ASU) BSE, Bioengineering **2002-2005**

EXPERIENCE

Patent Agent **Barnes & Thornburg LLP** **2019-present**

- Patent Bar: Registration #79301
- Prosecute and prepare patents, draft applications, conduct searches and respond to office actions.

Adjunct Faculty: School of Public Health, Indiana University-Purdue University Indianapolis **2016-present**

- Design and teach novel curriculum that combine engineering principles and global health issues.

Assistant Professor of Research: Orthopaedic Surgery, University of Virginia (UVA) **2012-2014**

- Oversaw the execution of a multiyear Department of Defense (DoD) grant.
- Managed research projects that required extensive IACUC involvement.
- Wrote grant applications and maintained follow up through completion.
- Mentored university students and medical residents.
- Presented research goals and outcomes to the research director of orthopaedics regularly.
- Participated in a due diligence team at the Coulter Foundation UVA examining the value proposition of new start-ups, including market analysis, evaluating business models and developing a business plan.

Postdoctoral Research Associate: Biomedical Engineering, UVA Edward Botchwey Lab **2010-2012**

- Developed and optimized biological assays with several cell lines.
- Examined the effect of different S1P receptor specific drugs on hematopoietic and mesenchymal stem cell mobilization/engraftment in mouse and rat models using both *in vitro* and *in vivo* assays.
- Evaluated bone regeneration in different animal models using a variety of scaffolds and growth factors.
- Developed novel biomaterial strategies for drug delivery to enhance endogenous tissue engineering.
- Maintained and developed collaborations with industry and academic partners via meetings, and site visits.

Graduate Research Assistant: Biological Engineering, MIT Roger Kamm Lab **2005-2010**

- *Thesis:* Mathematical modeling of angiogenesis using feedback for cell ensembles and validation on a microfluidic platform. Involved in in monitoring of several days long cellular assays via confocal imaging.
- Wrote a successful National Science Foundation: Emerging Frontiers in Research and Innovation (NSF-EFRI) grant with team collaboration.

Graduate Research Assistant: National University of Singapore (NUS) **Summer 2009**

- Partnered with MIT Bioengineering in initiation of the BioSyM Lab at NUS for the Singapore-MIT Alliance.

INTERNATIONAL/ DEVELOPMENTAL ENTREPRENEURSHIP EXPERIENCE

Consultant for Surgeons OverSeas: MIT Sloan School of Management **2008-2009**

- Collaborated with surgeons to determine the value proposition of a surgical health module in Sierra Leone.
- Conducted on-site assessment for improving healthcare service.

Project initiating electronic medical records in rural India **2007-2008**

- Performed market sizing and value proposition studies for a biometric-based medical record system.

Malaria initiative in Zambia: MIT Sloan School of Management **2008**

- Developed a database from interviews with individuals in the supply chain for malaria prevention and treatment.

AWARDS/CERTIFICATES (SELECTED)

Mentor of the Year- Young Investigators Quest [2019]
Frost Young Investigator Award: American Society of Bone & Mineral Research [2012]
Outstanding Biomedical Engineering Society Abstract [2010]
Medtronic Fellowship: MIT [2005-2006]
Sun Devil Star Award: ASU [2005]
School Of Life-sciences Undergraduate Research Fellowship: ASU [2004-2005]

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LEADERSHIP AND INVOLVEMENT (SELECTED)

Health and Science Innovations, Indianapolis [2016-present, STEM Advisory Board Chair (2017-present)]
Co-Chair of Cardiovascular Tissue Engineering Session - BMES, Atlanta [2012]
Invited Judge: Annual Huskey Research Exhibit by Graduate Students, UVA [2012, 2013]
MIT Graduate Student Council (GSC) [Editor-in-Chief, The Graduate (2009-2010)]
MIT BE Graduate Student Board [GSC Representative (2008-2009), Community Service Chair (2006-2007)]
Planning Committee of Global Poverty Initiative Conference at MIT [2007-2008]
Society of Women Engineers [ASU Chapter Vice President (2004-2005)]
AEMB Bioengineering Honor Society [ASU Chapter President (2004-2005)]

TECHNICAL SKILLS

Experimental: Cell culture, Microfluidics, Immunohistochemistry, FACS, MicroCT Analysis, X-Ray Analysis, Fluorescence Molecular Tomography, Scanning Electron Microscopy, Confocal Microscopy, Biomaterial scaffold design (nanofibers, microspheres, liposomes, microparticles), Pre-clinical animals models (stem cell mobilization and engraftment, bone defects, angiogenesis).

Computational: MicroSoft Office (Word, Excel, Powerpoint, Project), Visual C++, MathCAD, MATLAB, MINITAB, Graphical Analysis, LabVIEW, PSPICE, INSIGHT II, Maple, Labscribe, SOLIDWORKS, CompuCell3D, IMARIS, COMSOL, Deterministic and Stochastic Computational Modeling (ODEs, Boolean Logic, PLSR and Fuzzy Logic).

PUBLICATIONS (SELECTED)

- Authored an extensive list of academic papers in the therapeutic areas of regenerative medicine, tissue engineering, stem cell therapy, biomaterials, microfluidics, modeling and simulation.
- Given several oral and poster research presentations in international conferences.

RESEARCH PAPERS/ REVIEWS/ BOOK CHAPTERS

1. **Evaluating Angiogenic Potential of Small Molecules Using Genetic Network Approaches.** Das A, Merrill P, Wilson J, Turner T, Paige M, Capitosti S, Brown M, Freshcorn B, Sok MCP, Song H, Botchwey EA. Regen Eng Transl Med. 2019 Mar;5(1):30-41.
2. **Novel Lipid Signaling Mediators for Mesenchymal Stem Cell Mobilization during Bone Repair**. Selma JM, Das A, Awojoodu AO, Wang T, Kaushik AP, Cui Q, Song H, Ogle ME, Olingy CE, Pendleton EG, Tehrani KF, Mortensen LJ, Botchwey EA. Cell Mol Bioeng. 2018 Aug;11(4):241-253
3. **Sphingosine-1-Phosphate Receptor-3 Supports Hematopoietic Stem and Progenitor Cell Residence Within the Bone Marrow Niche**. Ogle ME, Olingy CE, Awojoodu AO, Das A, Ortiz RA, Cheung HY, Botchwey EA. Stem Cells. 2017 Apr;35(4):1040-1052.
4. **Poly(lactic-co-glycolide) polymer constructs cross-linked with human BMP-6 and VEGF protein significantly enhance rat mandible defect repair.** Das A, Fishero BA, Christophel JJ, Li CJ, Kohli N, Lin Y, Dighe AS, Cui Q. Cell Tissue Res. 2016 Apr;364(1):125-35.
5. **Enhanced osseous integration of human trabecular allografts following surface modification with bioactive lipids.** Wang T, Krieger J, Huang C, Das A, Francis MP, Ogle R, Botchwey E. Drug Deliv Transl Res. 2016 Apr;6(2):96-104.
6. **Bioactive lipid coating of bone allografts directs engraftment and fate determination of bone marrow-derived cells in rat GFP chimeras.** Das A, Segar CE, Chu Y, Wang TW, Lin Y, Yang C, Du X, Ogle RC, Cui Q, Botchwey EA. Biomaterials. 2015 Sep;64:98-107.
7. **The Impact of Deferoxamine on Vascularity and Soft-Tissue Biomechanics in a Rat TRAM Flap Model.** Mericli AF, Das A, Rodeheaver P, Rodeheaver GT, Lin KY. Plast Reconstr Surg. 2015 Jul;136(1):125e-127e.
8. **Current concepts of bone tissue engineering for craniofacial bone defect repair.** Fishero BA, Kohli N, Das A, Christophel JJ, Cui Q. Craniomaxillofac Trauma Reconstr. 2015 Mar;8(1):23-30. Review.
9. **Deferoxamine mitigates radiation-induced tissue injury in a rat irradiated TRAM flap model.** Mericli AF, Das A, Best R, Rodeheaver P, Rodeheaver G, Lin KY. Plast Reconstr Surg. 2015 Jan;135(1):124e-34e.
10. **Spatiotemporal oxygen sensing using dual emissive boron dye-polylactide nanofibers.** Bowers DT, Tanes ML, Das A, Lin Y, Keane NA, Neal RA, Ogle ME, Brayman KL, Fraser CL, Botchwey EA. ACS Nano. 2014 Dec 23;8(12):12080-91.
11. **Abluminal stimulation of sphingosine 1-phosphate receptors 1 and 3 promotes and stabilizes endothelial sprout formation**. Das A, Lenz SM, Awojoodu AO, Botchwey EA.Tissue Eng Part A. 2015 Jan;21(1-2):202-13.

12. **Stem cells in osteonecrosis**. Kaushik A, Das A, Cui Q. Book Chapter in "Osteonecrosis". 2014.
13. **Delivery of bioactive lipids from composite microgel-microsphere injectable scaffolds enhances stem cell recruitment and skeletal repair.** Das A, Barker DA, Wang T, Lau CM, Lin Y, Botchwey EA. PLoS One. 2014 Jul 31;9(7):e101276.
14. **The promotion of mandibular defect healing by the targeting of S1P receptors and the recruitment of alternatively activated macrophages**. Das A, Segar CE, Hughley BB, Bowers DT, Botchwey EA. Biomaterials. 2013 Dec;34(38):9853-62.
15. **Delivery of S1P receptor-targeted drugs via biodegradable polymer scaffolds enhances bone regeneration in a critical size cranial defect.** Das A, Tanner S, Barker DA, Green D, Botchwey EA. J Biomed Mater Res A. 2014 Apr;102(4):1210-8.
16. **Osteonecrosis of the femoral head: An update in year 2012.** Kaushik AP, Das A, Cui Q. World J Orthop. 2012 May 18;3(5):49-57.
17. **Cardiovascular Regenerative Engineering.** Neal R, Das A, BotchweyE. Book Chapter in "Regenerative Engineering". 2012.
18. **Local delivery of FTY720 accelerates cranial allograft incorporation and bone formation.** Huang C, Das A, Barker D, Tholpady S, Wang T, Cui Q, Ogle R, Botchwey E. Cell Tissue Res. 2012 Mar;347(3):553-66.
19. **Evaluation of angiogenesis and osteogenesis.** Das A, Botchwey E. Tissue Eng Part B Rev. 2011 Dec;17(6):403-14. Review.
20. **Determining Cell Fate Transition Probabilities to VEGF/Ang 1 Levels: Relating Computational Modeling to Microfluidic Angiogenesis Studies.** Das A, Lauffenburger D, Asada H, Kamm RD. Cell. and Molec Bioengr **2010.** 3(4): 345-360(16).
21. **A hybrid continuum-discrete modelling approach to predict and control angiogenesis: analysis of combinatorial growth factor and matrix effects on vessel-sprouting morphology**. Das A, Lauffenburger D, Asada H, Kamm RD. Philos Trans A Math Phys Eng Sci. 2010 Jun 28;368(1921):2937-60.
22. **A stochastic broadcast feedback approach to regulating cell population morphology for microfluidic angiogenesis platforms.** Wood LB, Das A, Kamm RD, Asada HH. IEEE Trans Biomed Eng. 2009 Sep;56(9):2299-303.
23. **A cytokine immunosensor for multiple sclerosis detection based upon label-free electrochemical impedance spectroscopy.** La Belle JT, Bhavsar K, Fairchild A, Das A, Sweeney J, Alford TL, Wang J, Bhavanandan VP, Joshi L. Biosens Bioelectron. 2007 Oct 31;23(3):428-31.

INVITED TALKS/ CONFERENCE PRESENTATIONS

1. Using microfluidics to evaluate the differential effect of S1P receptor targeting drugs on endothelial cell sprouting.
   - [*BioMedical Engineering Society (BMES)*, Seattle 2014]
2. Novel bioactive coatings to improve allograft incorporation evaluated in eGFP chimeric rats.
   - [*Society for Biomaterials (SFB)*, Boston 2013]
   - [*BMES*, Seattle 2014]
3. Spatiotemporal dissolved oxygen concentrations from a nanofiber cell seeded scaffold.
   - [*SFB*, Boston 2013]
4. S1P3 receptor antagonism results in the mobilization of hematopoietic stem and progenitor cells from the bone marrow.
   - [*BMES* Atlanta 2012]
5. Rapid vascularization and localized immune modulation induced by FTY720 enhances cell-based mandibular defect repair.
   - [*Military Health System Research Symposium*, Ft Lauderdale 2012]
   - [*BMES* Atlanta 2012]
   - [*SFB*, Boston 2013]
6. Local delivery of S1P receptor specific small molecules in nanofiber scaffolds enhance mandibular defect healing by recruiting progenitor cells and increasing vascularization.
   - [*Sun Valley Skeletal Biology Workshop*, Sun Valley 2012]
7. S1P receptors modulate endogenous stem cell mobilization and homing for bone regeneration.

- [*Hilton Head Regenerative Medicine Workshop*, HH 2012]
- [*Orthopaedic Research Society*, San Francisco 2012]
- [*BMES*, Atlanta 2012]

8. Evaluating the effects of FTY720 in comparison with BMP-2 on CSD healing.
   - [*BMES*, Hartford 2011]
   - [*Tissue Engineering & Regenerative Medicine International Society (TERMIS)*, Houston 2011]
9. Local delivery of S1P receptor specific drugs to enhance bone regeneration.
   - [*SFB*, Orlando 2011**]**
10. Capillary characteristics in microfluidic experiments and computational model.
    - [Rapid Fire: Regenerative Medicine: Innovations for Clinical Applications, *Hilton Head Regenerative Medicine Workshop*, HH 2011]
11. Decision tree analysis of microfluidic angiogenesis studies: determining cell fate transition probabilities to VEGF/Ang I levels.
    - [*BMES*, Austin 2010]

POSTER PRESENTATIONS

1. Investigation of novel thalidomide-based pro-angiogenic small molecules through gene network analysis.
   - [*BMES*, Seattle 2013]
2. Novel bioactive coatings to improve allograft incorporation evaluated in eGFP chimeric rats.
   - [*Virginia Orthopaedic Society*, Washington DC 2013]
3. Systemic FTY720 improves the survival and osteogenic capacity of implanted allogeneic mesenchymal stem cells.
   - [*BMES*, Atlanta 2012]
4. Rapid vascularization and localized immune modulation enhance cell-based mandibular defect repair.
   - [*Orthopaedic Research Society*, San Antonio 2013, *Hilton Head Regenerative Medicine Workshop*, HH 2012]
5. S1P receptor specific small molecule modulates endogenous stem cell homing for bone regeneration.
   - [*TERMIS Conference*, Houston 2011]
6. Tissue engineering by *in situ* manipulation of endogenous stem and progenitor cells.
   - [*BMES*, Hartford 2011]
7. S1P induced hematopoietic stem cell mobilization and vascular remodeling by bone marrow cell recruitment.
   - [*Vascular Cell Biology Gordon Research Conference*, Ventura 2011]
8. A multifaceted approach to the modeling of angiogenesis.
   - [*NSF-EFRI Conference,* Washington DC 2009]
9. A coarse grain model of angiogenesis.
   - [*American Society of Mechanical Engineering Conference*, Lake Tahoe 2008]
10. Development of a cytokine sensor for multiple sclerosis.
    - [*ASU School of Life Sciences,* 2004 and 2005]